

OGAP Additive Reasoning in the Classroom

A CVEDC course with an option of 3 graduate credits from St. Michael's College.

Course Title: Additive Reasoning in the Classroom: Ongoing Assessment and Instruction

Course Credits: 3 graduate credits from St. Michael's College

Time & Location:

Summer Sessions (8:00-4:00): August 7-9

School Year Implementation Sessions (3:00-7:00): Sept 28, Nov 16, Jan 11, Feb 15

Location: CVEDC Classroom, Fort Ethan Allen, Colchester, VT

Course Facilitators:

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Description:

*Strong number sense is one of the greatest indicators of a child's future success in school mathematics.
(Baroody and Ginsburg)*

The Additive Reasoning Course is a professional development opportunity for teachers based on the cognitive research currently available on misconceptions and developing understandings for students in additive reasoning. Teachers will become familiar with this research through the Ongoing Assessment Project (OGAP), which makes the research transparent and explicit, focuses on the systematic use of formative assessment in classrooms, and provides materials needed for implementation.

During the course, teachers will assess their students' understanding in the area of additive reasoning and develop instructional strategies to address student misconceptions and developing understandings. They will work closely with their colleagues to analyze the ongoing information they collect and to develop intervention strategies to increase their students' understanding. There will be a direct link between the research and the instructional methods. The sessions will be organized around content, math education research, evidence in student work, and decision-making using formative assessment and learning progressions. Session topics will include: number sense, counting, subitizing, number composition, number lines, equality, addition, subtraction and fact fluency.

Methodologies:

This course will incorporate a variety of teaching strategies, including modeling of research-based best practices. There will be lecture, discussion, small group collaborative learning, participant presentations, and constructed understanding through teacher facilitation and modeling.

Course Goals and Objectives:

- To provide familiarity with the Common Core State Standards (CCSS-M) related to additive reasoning
- To understand current research on student misconceptions and developing understandings of additive reasoning
- To understand and use ongoing assessment strategies and tools for the purpose of making instructional decisions
- To examine materials and methods for teaching mathematics related to additive reasoning
- To collaborate with a partner to plan, deliver, and evaluate instruction
- To increase understanding of methods that allow teachers to meet the needs of a diverse population of students in the regular classroom

- To increase ability to examine student work to identify student understanding and inform instruction
- To become familiar with gaps in program materials related to additive reasoning and the CCSS-M and plan for addressing them

Course Requirements:

- Assigned readings and responses
- Review of instructional program
- Implementation of formative assessment practices
- Piloting of the OGAP Additive Reasoning Item Bank and Learning Progression
- Documentation of classroom implementation
- Presentation of classroom implementation
- Attendance at all class sessions

Assignments/Grading Criteria

- Attendance at each class/class participation (30 points)
- Course Portfolio that includes: (25 points total)
 - All materials used and developed in the course organized in a way that ensures easy access in the future (5 points)
 - Reflective responses to readings (20 points)
- Classroom Portfolio that includes: (20 points total)
 - Ongoing reflection on student growth in reasoning based on formative assessment of student work samples (10 points)
 - Journal documenting and reflecting on teacher decisions, instructional changes, and observations of student understanding based on understanding of the cognitive research and implementation of OGAP formative assessment materials (10 points)
- Final Presentation of classroom implementation of additive reasoning instructional unit, and data about increased student learning through the analysis OGAP tasks (25 points)

Text: Fosnot & Dolk, Young Mathematicians at Work: Constructing Number Sense, Addition and Subtraction, 2001

Participants will also be expected to read a variety of current articles on additive reasoning, teaching addition/subtraction, effective instructional strategies, grade level expectations, and ongoing assessment strategies.

In addition, teachers will fully implement and pilot the materials developed through the NSF grant: OGAP (Ongoing Assessment Project) for Additive Reasoning, which are based on cognitive research about students' understanding of additive reasoning.

Additional Readings:

- Common Core State Standards in Mathematics, 2010
- Carpenter, Thomas, Thinking Mathematically, 2003
- Carpenter, Thomas, Children's Mathematics: Cognitively Guided Instruction, 1999
- Van De Walle, John, Teaching Student-Centered Mathematics: Grades K-2, 2012

Syllabus:

Date	Summer Session Topics
8/7/18 8:00-4:00	Module 1 & 2: Introduction to OGAP, What is Number Sense?, Counting, Subitizing <ul style="list-style-type: none">● characteristics of additive reasoning● OGAP Framework● fundamental number concepts
8/8/18 8:00-4:00	Module 3: Number Composition, Item Bank <ul style="list-style-type: none">● unitizing and base ten understanding● using tasks from OGAP Item Bank Module 4: Number Lines <ul style="list-style-type: none">● attributes of number line models● Number Line Progression
8/9/18 8:00-4:00	Module 5: Addition, Problem Posing <ul style="list-style-type: none">● addition situation problem structures● addition strategies Module 6: Subtraction <ul style="list-style-type: none">● subtraction situation problem structures● subtraction strategies

Date	School Year Session Topics
9/28/18 3:00-7:00	Module 7: Equality <ul style="list-style-type: none">● understanding the equal sign
11/16/18 3:00-7:00	Module 8: CCSS, Fact Fluency <ul style="list-style-type: none">● examine CCSS● fact fluency versus automaticity
1/11/19 3:00-7:00	Module 9: Math Games & Routines
2/15/19 3:00-7:00	Module 10: OGAP Implementation, Case study of implementation, Analyzing math program, Unit Planning, Embedded formative assessment tasks by unit, Sharing of final projects